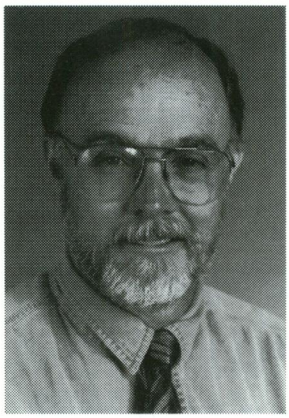
NIEHS News

Toxic Waste Research

The Superfund Basic Research Program at NIEHS integrates university-based studies designed to produce practical methods to reduce waste and prevent health risks and to generate basic scientific research to produce long-term solutions to hazardous waste problems. The program currently funds more than 1050 scientists on 142 separate research projects at a level of over $30 million, within 18 programs encompassing 29 universities and institutions around the United States. Federal legislation established the Superfund Program in 1986, and it is scheduled for reauthorization in September 1994.



William A. Suk—Directing development of solutions to hazardous waste problems.

The NIEHS Superfund Basic Research Program and its constituent university-based programs bring together a wide range of biomedical and non-biomedical disciplines. William A. Suk directs the program as chief of the Chemical Exposures and Molecular Biology Branch within the NIEHS Division of Extramural Research and Training.

"Grants made under this program are for coordinated, multicomponent, interdisciplinary programs, not individual studies," Suk explains. He points out that the grants are comparable to the NIH project program grants in that each university brings together an interdisciplinary team that works within its program, and each university program has a unified theme. Grants are awarded using a rigorous, competitive peer-review process administered by the National Institute of Environmental Health Sciences.

"The program's primary goal," Suk says, "is to bring together expertise from the biomedical sciences, engineering, ecology, and the geosciences to explore the scope of problems of uncontrolled hazardous waste, to seek solutions in carefully developed multidisciplinary collaborations, and to address public health concerns associated with hazardous wastes in the environment."

Suk notes that no other agency provides support for this kind of integrated research. The Superfund Program provides scientific information that is used by state, local, and federal agencies, private and public organizations, and industry to make decisions about the management of hazardous waste.

The program also sponsors and organizes conferences that bring together experts from diverse disciplines to discuss specific environmental problems. Conferences have recently been held on biodegradation, transport and interactions of metals, toxic combustion by-products, and pediatric environmental health.

Training science and other health professionals in the many disciplines participating in the university-based programs is an integral part of the NIEHS program. Training ensures continued progress on the hazardous waste problem within various fields. Some examples of studies and subject areas within the university-based programs include the following:

- Determining if chemicals associated with hazardous waste sites contribute to genetic changes in human populations around the sites,
- Investigating the use of a process called supercritical extraction/wet oxidation to destroy hazardous chemicals bound to soil particles,
- Investigating interactions between microbial populations and toxic metals and focusing on clean-up applications at a highly contaminated Superfund site,
- Monitoring dietary exposure to PCBs from hazardous waste in Mohawk women and children in New York State,
- Developing a technique to measure the accumulation of specific chemicals (porphyrins) in human urine, an accumulation directly attributable to mercury exposure,
- Developing a technique to measure P450 enzymes important in the body's detoxification of environmental chemicals,
- Investigating the link between the common drinking-water contaminant trichloroethylene and a birth defect involving malformation of the heart.

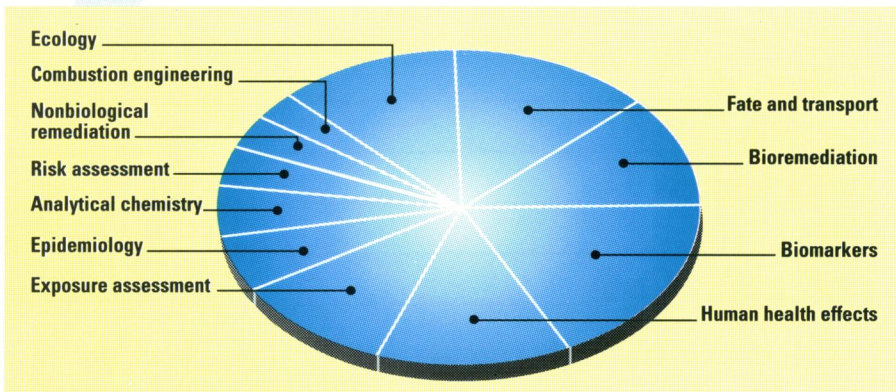
Areas that are the subject of current research and that present special opportunities for expansion include the following:

- Environmental equity—the program is looking at environmental health risks, particularly in children, posed by the fact that Superfund sites may be distributed inequitably across socioeconomic and racial groups.
- Ecology—NIEHS funds 27 projects on ecological damage posed by hazardous wastes, on toxic effects on natural succession of ecosystems, and on biodiversity.
- Technology transfer—the program is expanding the ability of researchers to transfer multidisciplinary technology from basic research to applied research and eventually to technology demonstrations and commercialization.
- Prevention of environmentally related disease and dysfunction—the program is conducting research on incineration as a means of waste remediation to include innovative technologies in incineration, health effects of exposure to combustion by-products, and monitoring of incinerator emissions.

The Superfund Program has enabled leading scientists around the country to contribute and collaborate in developing practical solutions to hazardous waste problems. For more information on the NIEHS Superfund Basic Research Program, the research of its grantees, and application procedures, contact William Suk at (919) 541-0797.

Fetal Lead Toxicity

Under an agreement with the National Institutes of Health's Office of Research on Minority Health (ORMH), NIEHS is conducting two key studies on lead toxicity to learn if lead in pregnant women is passed to the fetus. Millions of children in



Superfund Basic Research Categories